

ENGINEER'S REPORT

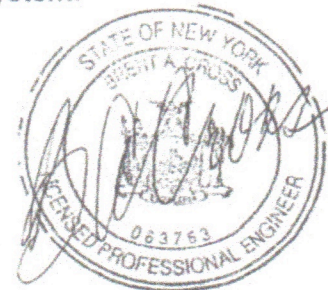
DATE: February 21, 2018
TO: Town of Cortlandville
FROM: Brent A. Cross, PE
RE: 1819 NYS Route 13 (tax parcel 77.00-12-07.000)

As the Engineer of Record for the design of the original stormwater management plan for this property, I have been requested by the owner to review recent modifications that have been made to the site, for verification of compliance with the original design dated 5/24/99.

In addition to many visits to this site over the course of the last 20 years, I have also been to the site to specifically observe the status of the recent modifications that were installed in the fall of 2017. These modifications are listed below including an explanation of the purpose and compliance with the original design.

1. The southern driveway has been regraded to re-establish elevations that previously directed the flow of run-off towards the culvert pipe that discharges into the adjacent retention basin. This will prevent unintended run-off from flowing past the inlet of the culvert pipe (bypassing the retention basin) and causing accumulation of run-off into the adjacent property and NYSDOT right of way.
2. The existing 12" diameter culvert pipe (to convey run-off into basin) has been replaced with a 24" diameter culvert pipe. Although no specific calculations have been done, the increased capacity of the new pipe should allow significantly more run-off to flow into the retention basin. The increased size of the pipe will provide approximately 400% more flow volume, which should account for any increase in run-off as a result of new hydrologic storm intensity.
3. The accumulation of sedimentation in the bottom of the basin has been removed to restore storage capacity of the original design.

Based on observation made by the Economy Paving staff during subsequent storm events and my own inspection of the system's functionality, it is my professional opinion that the recent modifications will not only restore the stormwater management system to its original design, but should increase/improve the capacity of the system.



ENGINEERS REPORT

DATE: January 2, 2019
TO: Cortland County Soil & Water Conservation District
FROM: Brent A. Cross, PE
RE: 1819 NYS Route 13, Town of Cortlandville, NY

BACKGROUND:

The property located at the above referenced address was historically used as a gravel pit, with a cold storage building, until 1998 when the property was developed into the current use including an office, maintenance shop and a storage yard for materials and equipment. As part of the permit for the construction of the new office building, a stormwater management plan was developed to provide mitigation of the run-off from the new impervious surfaces.

As a Professional Engineer, licensed in NYS, I was retained to make provide details of the site improvements needed to accomplish stormwater management at the level required by the Town of Cortlandville regulations in place at the time. It is my recollection that the Town specification was to provide stormwater management to accommodate a 50 year storm recurrence. Since that time, the regulations that have been passed down from the EPA Phase II Stormwater Regulations (2003) and the NYSDEC Stormwater SPDES Permit (2006) have changed significantly and require greater level of design such as quality treatment and 100 year storm intervals.

In the time since the original design of the stormwater management for this site (over 20 years ago), it has been officially documented that the history of hydrologic events has changed dramatically with more intense rainfalls that are occurring more often. Since this system was originally designed before this trend of storm activity, it does not have the same design capacity as newer systems that are being installed on similar non-residential properties.

Some of the storm events over the last 5-10 years have been documented to exceed the 100 year rainfall intensity. Therefore some of these events have resulted in run-offs that have not been able to be managed on this site. Observation of these events has led to questions about whether the installation of the original system is adequate to function as designed.

In an effort to address these concerns, I have revisited the physical aspects of this property and attempted to re-evaluate the original design features that were intended to meet the specifications of the Town of Cortlandville at the time. To assist with this analysis, the owner has commissioned a new topographic survey of the property to identify the elevation/grades of important features of the site such as "direction of flow" and pond size/depth. (see attached topographic survey by Denkenberger, PLS 8/2/17).

SYSTEM EVALUATION:

The topographic graphic information was used in conjunction with the original design assumptions such as:

- approximation of 50% of the uphill run-off is directed into the pond through the inlet pipe at the west end of the pond, and 50% directed through the collection system that enters the pond on the north side of the pond (between office/shop).
- run-off coefficients of various ground cover conditions were estimated and applied to the proportional acreage as determined on the survey map.
- the shape of the basin with depth and width data to determine the capacity of the pond as it was constructed in the field.

Other important design details were confirmed, such as the application of the Rational Method as the NYSDOT approved formula for determination of Highway Drainage, and the 50 Year 1-hour Rainfall intensity Map by the US Geological Survey.

The run-off from the site is collected from 2 sub-catchment areas. The southwest half of the lot is Area#1 and the northeast half of the lot is Area#2. The pre-development and post development run-off from each of these areas has been calculated by the Rational Method (see worksheet 2&3))

The total area of this parcel of land is approximately 28 acres (see attached map by Denkenberger). Since the existing land use (pre-development conditions) was approximately 40% gravel and 60% forested and fallow field, the run-off from the site prior to the addition of the office/shop is calculated to be approximately 13.4 cfs (see worksheet 3). The majority of the site (approximately 20 acres) remained unchanged from the predevelopment conditions (forest and gravel yard). Approximately 8 acres of the land that was previously "fallow" was developed into the office/shop complex. After applying higher run-off coefficients to this area, the post development flow increased to 17.8 cfs.

The retention basin has a small overflow swale located in the northeast corner, which will allow the flow to discharge into the NYS Route 13 ROW at an elevation of 1109.2'. The storm retention basin was built with approximately 28,318 cf of storage volume (below outlet elevation 1109.2'). With the peak run-off rate of 16.9 cfs, this will provide for 28 min of storage (first flush) before the run-off will start to flow out of the outlet. This water will remain in the basin after the storm has ceased, so that any contaminants (oil/dirt/salt) can be absorbed into the earth by infiltration.

The rim of the stormwater basin is at elevation 1109.8'. Once the run-off elevation reaches the outlet elevation, the outlet should discharge at the pre-development rate of 14.2 cfs. This will then continue store run-off at the rate of 2.7 cfs (difference between pre and post development), which will allow for an additional 56 min of detention. Therefore the total time of storage before overtopping of the basin/driveway elevation is 84 mins (1.4 hours), which exceeds the 50 year (1 hour) design criteria.

The original design called for a 12" diameter inlet pipe to direct all of the run-off from Area#1 into the storm basin. Over the course of time, the owner has replaced the original pipe with a new 24" diameter N12 smooth bore polyethylene pipe that has much greater capacity. If the pipe were able to be function at full pipe flow, the capacity is 12.0 cfs (see attached ADS Figure 3-1), which is much greater than the calculated post development flow of 7.5 cfs from Area#1.

Since the area of the lot where the storm detention basin is located is very flat, the inlet to the 24" pipe is only 16" below (recently raised by the owner) the elevation that prevents the flow from discharging through the service driveway, which leads directly to the NYSDOT Route 13 ROW (without going through the storm basin). Therefore the capacity of the Area#1 Inlet Pipe is limited to approximately 7.32 cfs, which is approximately equal to the post development peak run-off from Area#1.

CONCLUSION:

Based on current data such as topographic survey and revised hydrologic and hydraulic calculations, the stormwater management practices currently in place at 1819 NYS Route 13, are functionally capable of handling the run-off of the required 50 year storm event.

DISCLAIMER:

This report is intended to be a technical evaluation of the design capacity of the existing stormwater management practices at this site based on engineering methods as employed at the time of the original design. It is not intended to be an evaluation of the system using current design standard specified by the latest issuance of the NYSDEC SPDES General Permit for Stormwater Discharge. Since there were no previous concerns about the collection of run-off through the Area#2, no analysis of that inlet pipe was made.
